WHERE IS OUR SCHOOL COOL?

Suggested Grades

4, 5

SD Mathematics Strand & Standard *(Primary for Task)*

Statistics and Probability

4.S.1.2 Given a small ordered data set of whole number data points (odd number of points), students will identify the median, mode, and range.

Task Summary

Students will gather data, organize the data in a table, and then compare their data by computing the median, range, and mode.

Time and Context of Task

1 to 2 class periods. Students need to know how to read a thermometer. Students must have a working understanding of median, mode, and range.

Materials Needed

Indoor thermometers, paper, pencils, chart paper, and writing paper

Author and Lead Teacher for the Task

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Students will accurately measure the temperature in various locations throughout the school building, more than 5, but less the 10.

They will use this information to draw conclusions as to where the warmest, coolest, most consistent, and largest temperature variations occur.

Students will create a table of their data, and then find the median, range, and mode of their data for comparison.

Students will then write a brief comparison summary of their findings, using correct mathematical language.

CONTENT STANDARDS

Primary Standard

Strand Name: Statistics and Probability
SD Goal: Students will apply statistical methods to analyze data and explore probability for making decisions and predictions.
Indicator: Use statistical models to gather, analyze, and display data to draw conclusions
Standard: 4.S.1.2 Given a small ordered data set of whole number data points (odd number of points), students will identify the median, mode, and range.

Supplemental Standards

Strand Name: Statistics and Probability
SD Goal: Students will apply statistical methods to analyze data and explore probability for making decisions and predictions.
Indicator: Use statistical models to gather, analyze, and display data to draw conclusions
Standard: 4.S.1.2. Given a small ordered data set of whole number data points (odd number of points), students will identify the median, mode, and range.
Strand Name: Measurement
SD Goal: Students will apply systems of measurement and use appropriate measurement tools to describe and analyze the world around them.
Indicator: Apply measurement concepts in practical applications
Standard: 5.M.1.4. Use appropriate tools to measure length, weight, temperature, and area in problem solving.

NCTM Process Standard

Problem-solving

- Build new mathematical knowledge through problem solving
- Apply and adapt a variety of appropriate strategies to solve problems

Communication

- Use the language of mathematics to express mathematical ideas precisely

Connections

- Recognize and apply mathematics in contexts outside of mathematics

Representation

- Create and use representations to organize, record, and communicate mathematical ideas

Problem-Solving Strategies

- Drawing pictures, graphs, and tables
- Working backward
- Use of manipulatives

ASSESSMENT TOOLS

Task Rubric

Standard	Advanced	Proficient	Basic	Below Basic
4.S.1.2 Given a small ordered data set of whole number data points (odd number of points), students will identify the median, mode, and range.	Students accurately explain median, mode, and range, and use data appropriately to describe the situation.	Students can find range, median, and mode, and make a logical connection between them.	Students can find range, median, and mode.	Students can not accurately complete math task to find range, median, and mode.
5.M.1.4 Use appropriate tools to measure length, weight, temperature, and area in problem solving.	Student will correctly measure and record temperatures throughout the building, accurately place data into an organized chart, and precisely describe the relationship in a short summary.	Student can measure and record information, place data into a chart, and write a summary of their findings.	Student can record and measure temperatures. Charts are hard to understand; written summary is missing or lacks important data.	Student can read a thermometer, record some temperatures, charts are not accurate, or missing, and written summary is unrelated or missing.

Additional rubrics can be retrieved from K-12 Exemplars.com
http://www.exemplars.com/resources/rubrics/assessment.html

Fourth Grade Statistics & Probability
Performance Descriptors

Advanced	**Fourth grade students performing at the advanced level:** • collect data and create a graphical representation; • identify and use median, mode, and range to solve problems; • determine probability of events.
Proficient	**Fourth grade students performing at the proficient level:** • interpret data from graphical representations; • identify median, mode, and range; • determine outcome of events as equally likely and not equally likely.
Basic	**Fourth grade students performing at the basic level:** • answer questions from graphs; • identify mode; • recognize the likelihood of outcomes in simple events.

Fourth Grade Statistics & Probability
ELL Performance Descriptors

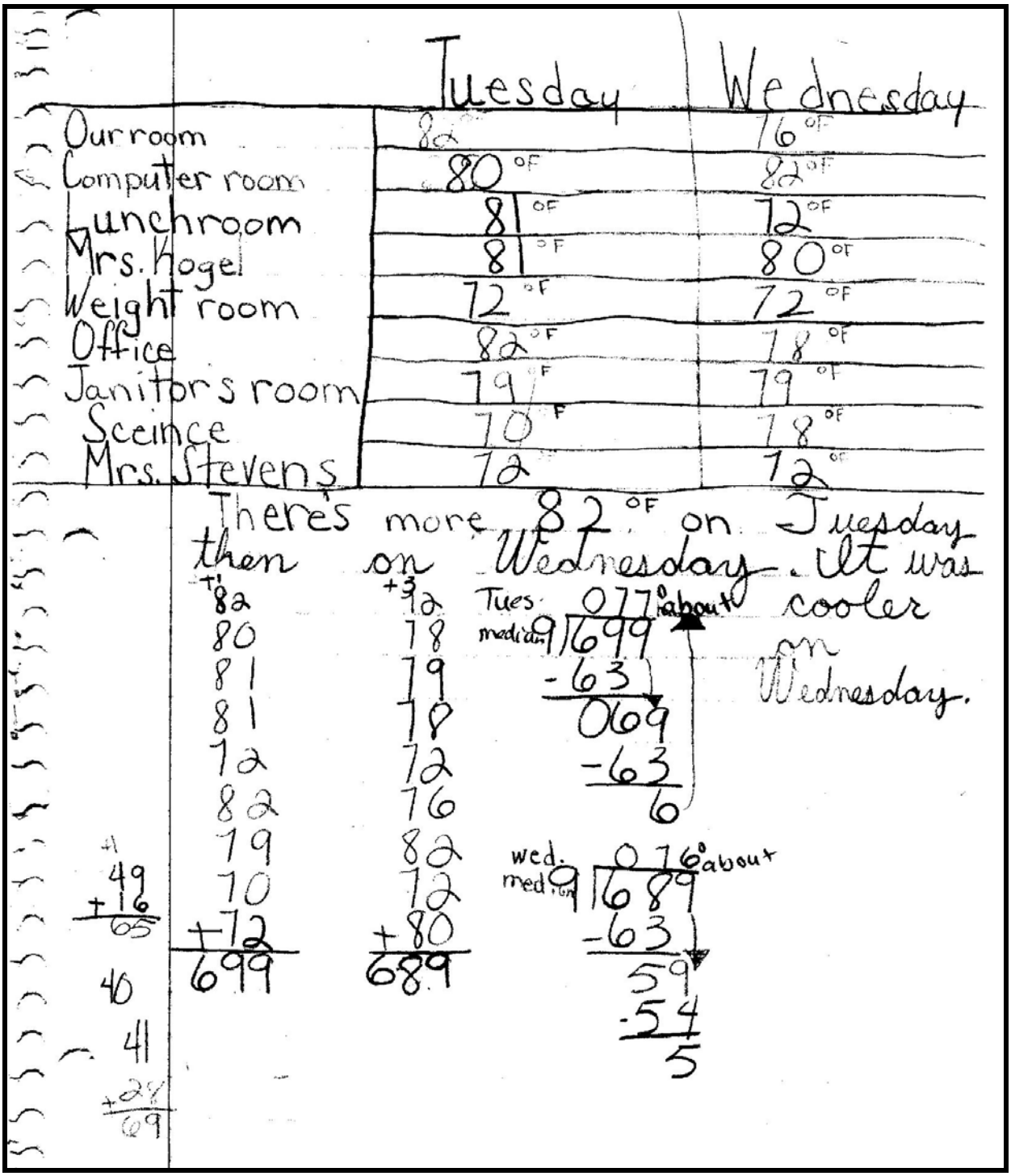
Proficient	**Fourth grade ELL students performing at the proficient level:** • represent data in bar graphs given appropriate scales; • identify mode from a given data set; • determine the probability of events as equally or not equally likely using pictorial representations; • read, write, and speak the language of mathematics.
Intermediate	**Fourth grade ELL students performing at the intermediate level:** • read and answer directed questions from graphs; • determine the probability of events as equally or not equally likely using concrete materials; • answer directed questions from graphs; • explain in mathematical terms the sequence of steps used in solving problems; • give simple oral or written responses to questions on topics presented in class.
Basic	**Fourth grade ELL students performing at the basic level:** • identify mode in data sets; • recognize and use basic statistics and probability terms; • respond to yes or no questions and to problems presented pictorially or numerically in class.
Emergent	**Fourth grade ELL students performing at the emergent level:** • answer directed questions about the data; • imitate pronunciation of statistics and probability terms; • use non-verbal communication to express mathematical ideas.
Pre-emergent	**Fourth grade ELL students performing at the pre-emergent level:** • observe and model appropriate cultural and learning behaviors from peers and adults; • listen to and observe comprehensible instruction and communicate understanding non-verbally.

WHERE IS OUR SCHOOL COOL?
Student Work Samples

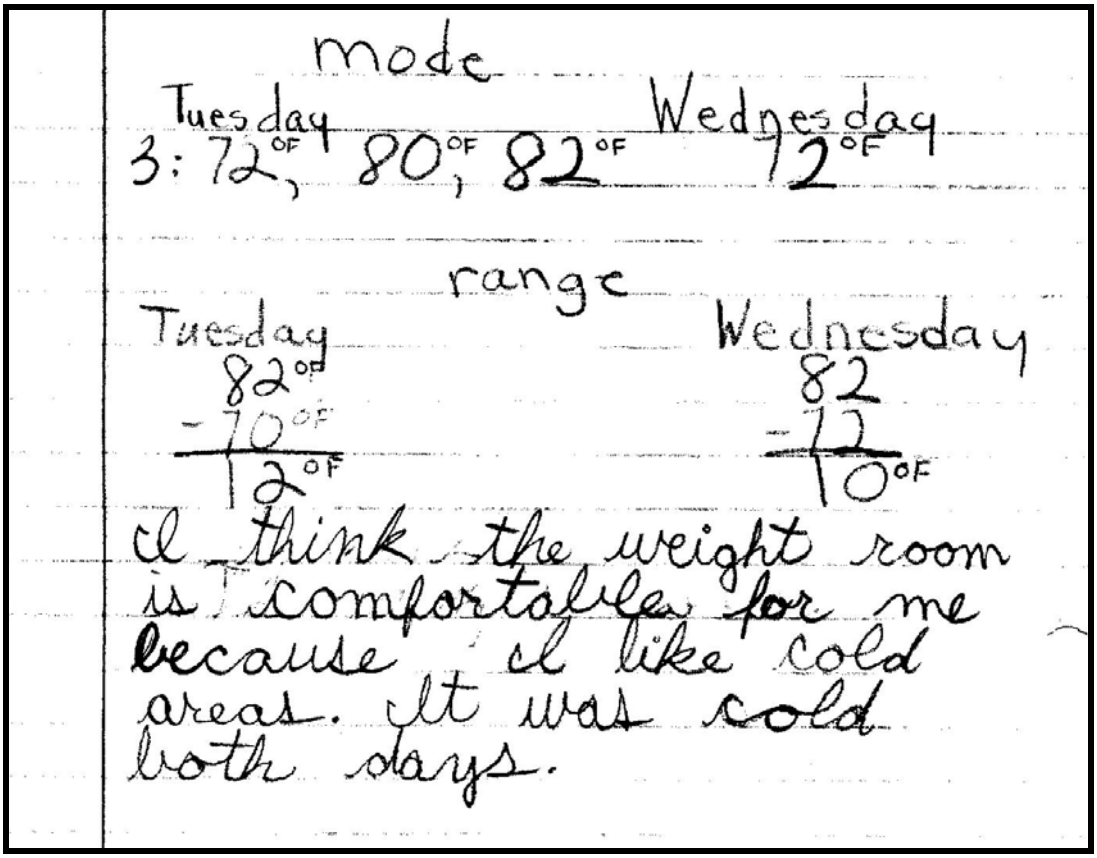
As you examine the samples, consider the following questions:

- In light of the standard/s addressed and the assessment tools provided, what evidence does the work provide that students are achieving proficiency in the knowledge and skills addressed by the standard/s for the task?
- Is the task/activity well designed to help students acquire knowledge and demonstrate proficiency? Is the task/activity clearly aligned with the standards? In what ways would you adapt the task/activity to better meet the needs of your students?

Student Work Sample #1
Page 1



Sample #1 - Page 2

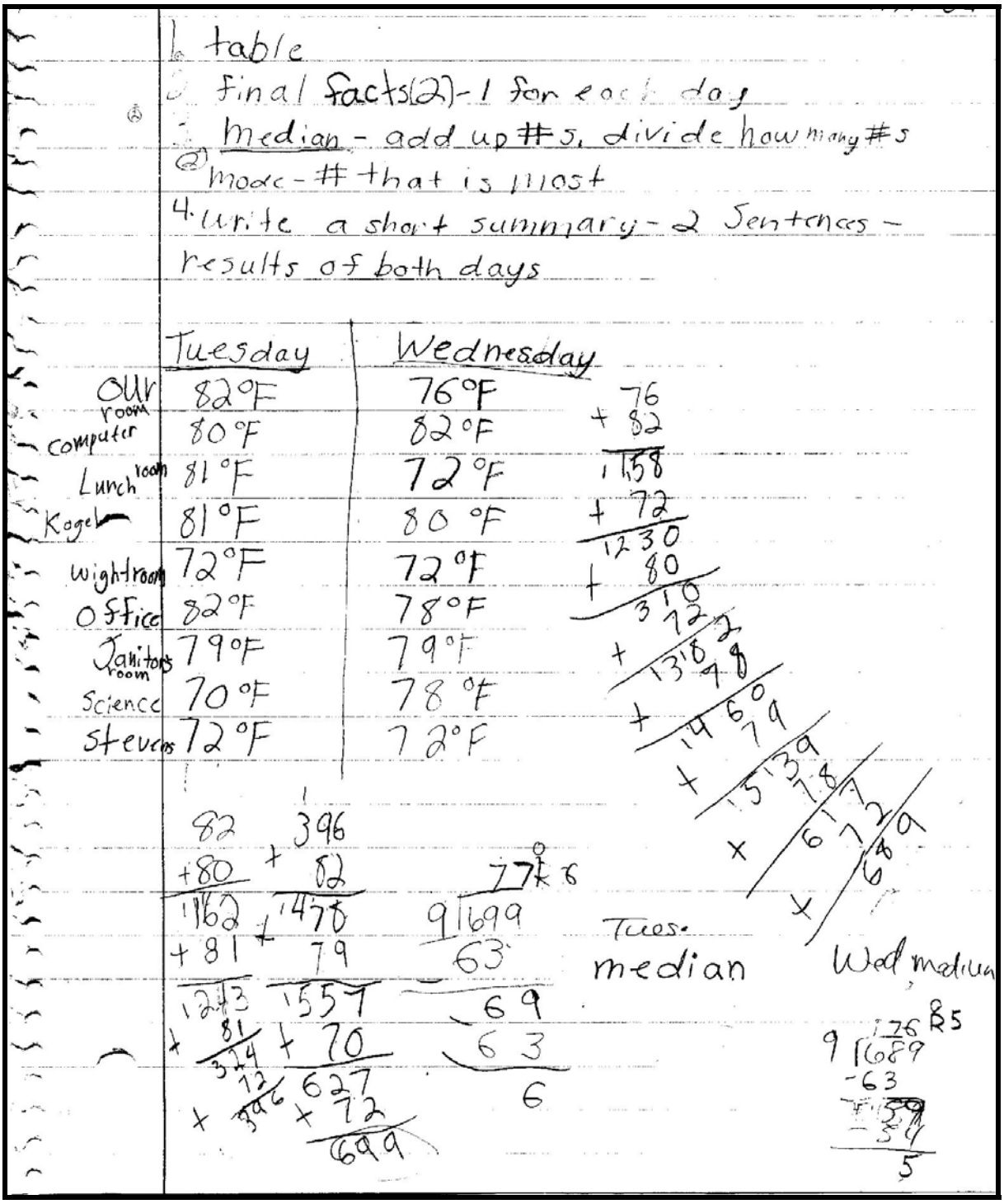


Looking at Student Work – Instructor notes and rating for work sample #1:

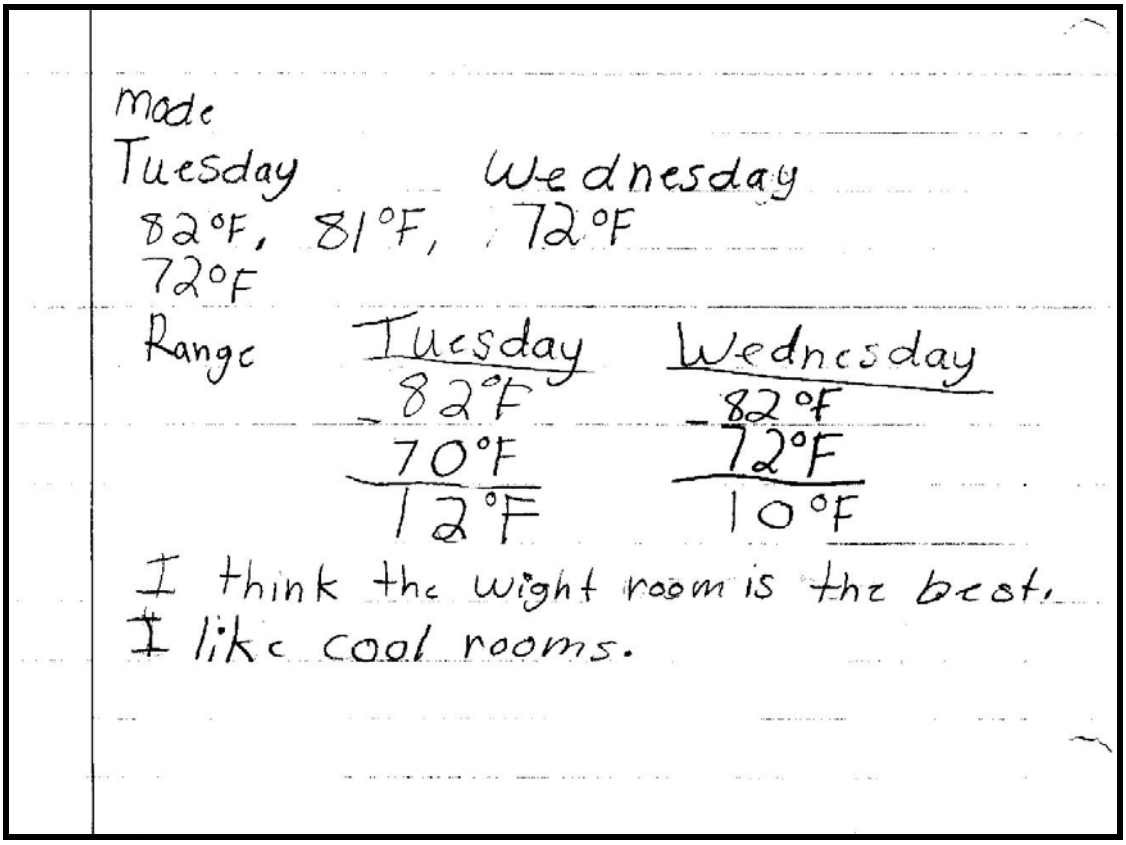
Advanced – Reasoning using the attached rubric: Students clearly understood the task ***as it was presented.*** The student shows a clear understanding of the data and made logical and correct conclusions. The problem is easily understood, and good communication of concepts and language are present.

Explanation for incorrect data set: The task ***as it was presented*** had students find the range, mode, and MEAN. This was an incorrect procedure as directed by the classroom teacher.

Student Work Sample #2
Page 1



Sample #2 - Page 2

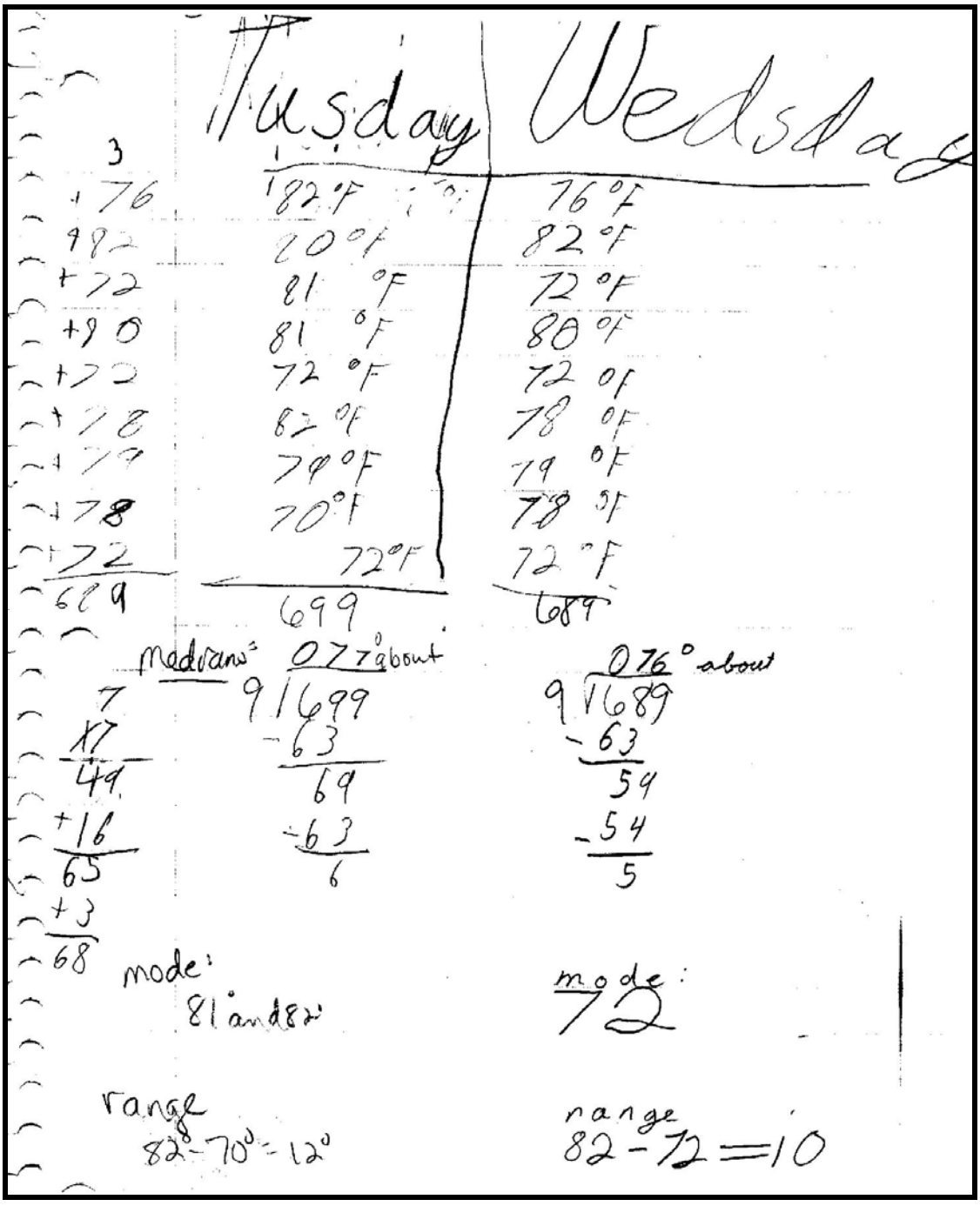


Looking at Student Work – Instructor notes and rating for work sample #2:

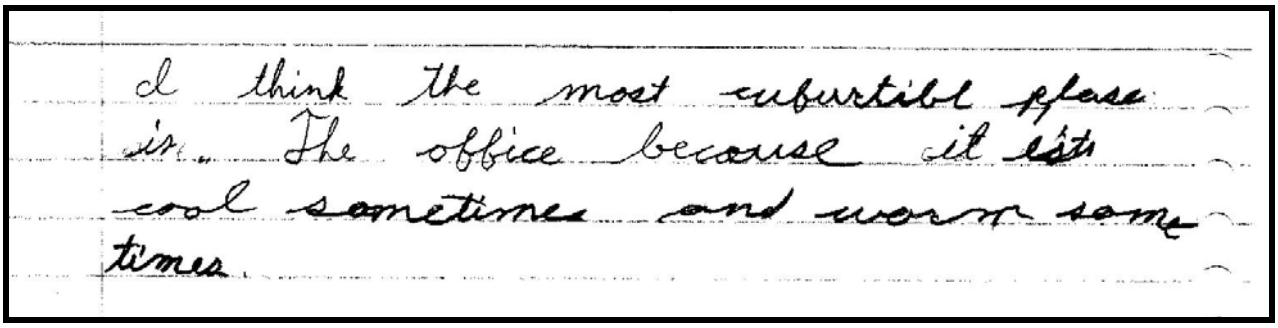
Proficient: Student clearly understood the mathematical procedures ***as they were presented.*** There are clearly mathematical connections made, and the students completed all parts of the task as they were instructed.

Explanation for incorrect data set: The task ***as it was presented*** had students find the range, mode, and MEAN. This was an incorrect procedure as directed by the classroom teacher.

Student Work Sample #3
Page 1



Sample #3 – Page 2


I think the most suburtibl place is. The office because it gets cool sometimes and worm sometimes.

Looking at Student Work – Instructor notes and rating for work sample #3:

Proficient/basic: Students has addressed all the math issues, ***as it was presented,*** though the interpretation of the data for the communication of concept is weak.

Explanation for incorrect data set: The task ***as it was presented*** had students find the range, mode, and MEAN. This was an incorrect procedure as directed by the classroom teacher.

INSTRUCTIONAL NOTES

Author Comments
This task could also be used and extended to times of day, outdoor temperature, and temperature variations with in the room.

Task Extensions
Students could also include the mean temperature if they understand the concept.

Common Strategies
Students need to correctly add and subtract to find range. Students need to correctly align numbers from smallest to largest to identify range and median.

Common Misunderstandings
I found that the students were weak in the area of identifying correctly and applying the terminology of median, range, and mode.

Interdisciplinary Connections
Students could use the temperatures to develop a story on the changes within the school, and support their generalizations with their data.

Resources

SD Mathematics Content Standards
http://www.doe.sd.gov/contentstandards/math/index.asp
SD Assessment and Testing
http://www.doe.sd.gov/octa/assessment/index.asp
The National Assessment of Educational Progress (NAEP)
http://www.doe.sd.gov/octa/assessment/naep/index.asp
National Council of Teachers of Mathematics
http://nctm.org/
Looking at Student Work
http://www.lasw.org/index.html